

Claims

- Sub 231*
1. A method of automatically retracting a stabilizer leg for a work machine, the work machine
5 operatively associated with a power source and having a control device for selecting forward or reverse directions of movement for the work machine, comprising the steps of:
- 10 a. utilizing a control lever for moving the stabilizer leg between fully extended and fully retracted positions, the control lever being normally located in and biased to a neutral position;
- manually moving the control lever to either of an extend position or a retract position;
- 15 manually holding the control lever in either of the extend or retract positions to respectively extend or retract the stabilizer leg to any of a plurality of desired positions between the fully extended and fully retracted positions;
- 20 manually moving the control lever to a auto-retract position; and
- ~~retaining the control lever in the auto-~~ *the control lever being maintained in the auto-retract position w/o...*
~~retract position without further manually manipulation thereof through a responsive means that overcomes the~~
- 25 biasing action of the control lever to facilitate the automatic retraction of the stabilizer leg from any of the plurality of desired positions to the fully retracted position.
- 30 2. The method of automatically retracting a stabilizer leg of claim 1, wherein the step of retaining the control lever in the auto-retract position includes the steps of:
- activating a control switch by the movement
- 35 of the control lever to the retract or auto-retract

position, the control switch being communicable with the power source;

activating a time delay mechanism in response to the activation of the control switch; and

5 activating a solenoid detent in response to the activation of the time delay mechanism, the solenoid detent acting as the responsive means for retaining the control lever in the auto-retract position and being operative with the time delay
10 mechanism to facilitate the automatic retraction of the stabilizer leg within a preselected time. ?

3. The method of automatically retracting a stabilizer legs of claim 2, including the step of:

15 disabling the solenoid detent and interrupting the automatic retraction of the stabilizer leg by manually moving the control lever during the preselected time.

20 (4.) The method of automatically retracting a stabilizer leg of claim 3, including the step of:

activating an alarm device coupled with the control device and time delay mechanism by selecting the forward or reverse direction of the work machine
25 with the control device prior to the completion of the preselected time.

does this mean delaying 17?

Sub (5.) The method of automatically retracting a stabilizer leg of claim 3, ^{including} wherein the step of:

30 activating an alarm device coupled with the control device and time delay mechanism by having the forward or reverse direction of the work machine selected via the control device and with the control lever in either of the retract or auto-retract
35 positions.

6. The method of automatically retracting a stabilizer leg of claim 1, wherein manually holding the control lever for moving the stabilizer leg from any of the plurality of desired positions to the fully retracted position includes the steps of:

initializing a flow of hydraulic fluid to move from a pump to a hydraulic cylinder in connection with the stabilizer leg;

10 actuating a pair of pilot valves connected with the pump to an open position through the flow of the hydraulic fluid; and

15 actuating a spool valve connected between the pair of pilot valves and the hydraulic cylinder to an open position through the flow of hydraulic fluid in response to the actuation of the pair of pilot valves.

~~7. The method of automatically retracting a stabilizer leg of claim 6, wherein the step of initiating a flow of hydraulic fluid to move from a pump to a hydraulic cylinder includes the steps of:~~

~~increasing the hydraulic fluid from a first pressure prior to moving through the pump to a second pressure greater than the first pressure after moving through the pump;~~

~~increasing the hydraulic fluid from the second pressure prior to flowing through the pair of pilot valves to a third pressure greater than the second pressure after flowing through the pair of pilot valves; and~~

~~increasing the hydraulic fluid from the third pressure prior to flowing through the spool valve to a fourth pressure greater than the third pressure after flowing through the spool valve.~~

how
is
this
accomplished

and this

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Sub 44 ⑧. The method of automatically retracting a stabilizer leg of claim 1, including the step of:

utilizing the control lever for moving
5 another stabilizer leg between fully extended and fully retracted positions;

manually moving the control lever ^{of the other stabilizer} to either an ~~of another~~ extend or retract position;

manually holding the control lever ^{of the other stabilizer} in either
10 ~~of the another~~ extend or retract positions to

respectively extend or retract the ~~another~~ ^{other} stabilizer leg to any of a plurality of desired positions between the fully extended and fully retracted positions;

manually moving the control lever ^{of the other stabilizer} to ~~another~~
15 auto-retract position; and

retaining the control lever in the ~~another~~ ^{other} auto-retract position without further manually manipulation thereof through a responsive means that overcomes the biasing action of the control lever to
20 facilitate the automatic retraction of the ~~another~~ ^{other} stabilizer leg from any of the plurality of desired positions to the fully retracted position.

9. The method of automatically retracting a
25 stabilizer leg of claim 1, including the step of:

utilizing a second control lever for moving
a second stabilizer leg between fully extended and fully retracted positions, the second control lever being normally located in and biased to a neutral
30 position;

manually moving the first and second control levers to either of an extend position or a retract position;

manually holding the first and second
35 control levers in either of the extend or retract

positions to respectively extend or retract the first and second stabilizer legs to any of a plurality of desired positions between the fully extended and fully retracted positions;

5 manually moving the first and second control levers to an auto-retract position; and

retaining the first and second control levers in the auto-retract position without further manually manipulation thereof through a responsive means that overcomes the biasing action of the first and second control levers to facilitate the automatic and simultaneous retraction of the first and second stabilizer legs from any of the plurality of desired positions to the fully retracted position.

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10. The method of automatically retracting a stabilizer leg of claim 9, wherein the step of retaining the first and second control levers in the auto-retract position includes the steps of:

20 activating a respective control switch by the movement of the first and second control levers to the retract or auto-retract position, the control switches being communicable with the power source;

activating a respective time delay mechanism in response to the activation of the control switches; and

activating a respective solenoid detent in response to the activation of the time delay mechanisms, the solenoid detents acting as the responsive means for retaining the first and second control levers in the auto-retract position and being operative with the respective time delay mechanism to facilitate the automatic retraction of the first and second stabilizer legs within a preselected time.

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11. A work machine having front and rear end portions, a control panel disposed within an interior of the work machine, a pair of stabilizer legs connected to the rear end portion, [a hydraulic cylinder operatively associated with each of the pair of stabilizer legs] for moving the stabilizer legs in a plurality of desired positions between fully extended and fully retracted positions] via a source of hydraulic fluid,] and a control device located within the interior of the work machine for selecting the forward or reverse direction of the work machine, the control device comprising:

a main valve connectable ~~with each of the hydraulic cylinders for controlling the movement of the stabilizer legs;~~

a pair of pilot valves in connection with each of the main valves;

a pair of control levers in connection with a respective pair of pilot valves for actuation thereof, the control levers normally biased to a neutral position and movable between a first position for actuating the main valves in response to the actuation of one of the pilot valves to extend the stabilizer legs to any of the desired positions, a second position for actuating the main valves in response to the actuation of the other of the one of the pilot valves to retract the stabilizer legs to any of the desired positions, and a third position; and

means for automatically retaining the pair of control levers in the third position for actuating the main valves in response to the actuation of the other one of the pilot valves to simultaneously retract the stabilizer legs from any of the desired positions to the fully retracted position within a preselected period of time.

12. The work machine of claim 11, wherein the retaining means includes a control switch connected to each one of the pair of pilot valves and
5 communicable with the power source, a time delay mechanism connected with and responsive to the control switches, and a solenoid detent connected between the time delay mechanism and each of the pair of control levers and operative with the time delay mechanism.

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13. The work machine of claim 12, wherein the solenoid detent is engaged with a respective control lever when the respective control lever is in the third position.

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14. The work machine of claim 12, wherein movement of the pair of control levers during the preselected time interrupts the simultaneous retraction of the pair of stabilizer legs.

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15. The work machine of claim 12, wherein the movement of the work machine via the control device while the pair of control levers is in either of the second or third positions activates an alarm
25 device.

16. A method of automatically retracting a stabilizer leg for a work machine, the work machine operatively associated with a power source and having
30 a control device for selecting forward or reverse directions of movement for the work machine, comprising the steps of:

utilizing a pair of control levers for moving a pair of stabilizer legs between fully
35 extended and fully retracted positions, the control

levers being normally located in a neutral position and movable to first, second, and third positions wherein the movement of either of the control levers to the first position promotes the movement of a
5 respective stabilizer leg to a plurality of extended positions and the movement of either of the control levers to the second position promotes the movement of the respective stabilizer leg to a plurality of retracted positions, the control levers being biased
10 to the neutral position when in the first, second, or third position;

moving either of the control levers to the third position; and

15 automatically maintaining either of the control levers in the third position to overcome the biasing action on the control levers for moving the respective stabilizer leg from any of the plurality of extended or retracted positions to the fully retracted position;

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17. The method of automatically retracting a stabilizer leg of claim 16, wherein the step of automatically maintaining either of the control levers in the third position includes the step of:

25 initially contacting either of the control levers to move them to the third position and relinquishing contact after the control levers are in the third position.

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18. The method of automatically retracting a stabilizer leg of claim 16, including the steps of:

connecting a control switch with each of the respective control levers, the control switch being communicable with the power source;

connecting a time delay mechanism with the control switches;

connecting a solenoid detent with the time delay mechanism;

5 moving either of the control ~~levers to the~~

not in spec. (second or third position activates the control switch, time delay mechanism, and solenoid detent, the

solenoid detent maintaining the respective control lever in the third position in response to the time
10 delay mechanism so that the automatic retraction of the respective stabilizer leg is completed within a preselected time; and

moving the control levers during the preselected time disables the solenoid detent and
15 interrupts the automatic retraction of the stabilizer legs.